

Water and Hydro-Conflict in South Asia: Issues and Challenges

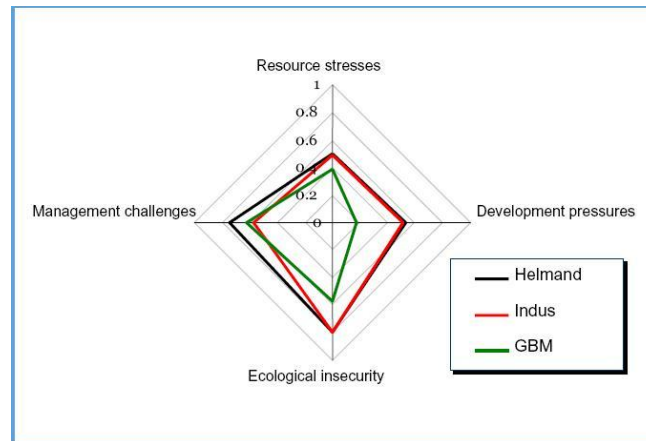
Introduction

The distribution of environmental resources as a potential contributor to conflict has been the subject of considerable research, and these linkages have dominated the post-Cold War interest in environmental security. Within this genre, much attention has been given to water resources, owing to their vital importance for human survival. Perhaps no other resource—other than oxygen—is so intricately linked to human health and survival. Water is considered, therefore, as one of the most crucial non-traditional security issues. Today, many South Asian countries are beginning to experience moderate to severe water shortages, brought on by the simultaneous effects of agricultural growth, industrialisation, and urbanisation. As the region's population growth continues to surge, the demand for water is increasing substantially, without a concomitant increase in water resources¹. Indeed, clean freshwater is not only essential for human life, but also for economic development and agriculture. Consequently, a severe reduction in water resources can damage a nation's economy and food supply. Such a scenario could potentially lead to social unrest and exacerbate existing ethnic, racial and societal conflicts². A parallel problem is that these same economic and social problems may systematically erode a government's ability to deal with them. In extreme cases governance itself may be undermined, resulting in internal chaos and national collapse. The international "spill over" effects of such outcome—such as mass refugee outflows—would be destabilising for neighbouring countries³.

Water Scarcity: Access Vs Availability

The world's freshwater supply is finite. Most of the world's water—about 97.5 percent—exists as salt water in the oceans and seas. Of the world's 2.5 percent of freshwater, roughly 99 percent is either trapped in glaciers and ice caps, held as soil moisture or located in water tables too deep to access. Thus, only about one percent of the world's total freshwater supply is readily available for consumption by humans, animals and for irrigation⁴. Moreover, the world's population is growing by about 80 million people a year, implying increased freshwater demand of about 64 billion cubic metres a year⁵. Water stress occurs when a country's annual water supplies drop below 1,700 cubic metres per person. When these levels reach between 1,700 and 1,000 cubic metres per person, occasional water shortages are likely to occur⁶. Availability refers to the physical presence of adequate water supplies, whereas access refers to the ability of people within a particular country or region to actually receive or gain access to clean freshwater. Obviously, these are two distinct types of problems, although they can both be present in a region experiencing water stress or water scarcity.

Figure- A: Sources of Vulnerability in South Asian River Basins⁷



The figure shows that for both the Helmand and Indus basins, ecological insecurity contributes most to the water resources vulnerability, while management challenges pose the greatest risk in the GBM Basin⁸.

Water as a Security Concern

In the post Cold War era, the definition of security is being expanded to include a host of non-traditional issues. Regardless of how water security defined, there is a consensus that freshwater scarcity poses a very serious, complex and potentially wide-ranging threat to regional stability. This threat could manifest itself in a number of different ways, such as directly in the form of violent conflicts over freshwater resources, or indirectly, by causing large-scale migration and food shortages. To fully appreciate the complexity of the water security issue, it has to be viewed on three basic levels:

- a) *Human Security*⁹: Freshwater can become a security issue when it is linked to so-called “human security,” which encompasses a variety of issues that have an impact on human health and well-being. The largest mass poisoning of a population in history is now underway in Bangladesh. The number of people affected by this arsenic disaster is among the greatest of any disease facing the world today. Approximately 25,000 people die every day from water related diseases. In Bangladesh, it is estimated that three-quarters of all diseases are linked to unsafe water and inadequate sanitation facilities. Experts estimate that about 60% of all infant mortality throughout the world is tied to infectious and parasitic diseases, most of them related to water¹⁰.
- b) *Internal Security and Governance*: The specific impact of freshwater on intra-state security is far more complex and less easily ascertained. Water insecurity constrains economic development and contributes to a host of corrosive social behaviours that can, in turn, produce violence within societies¹¹. Freshwater scarcity, often causally related with other factors, such as poverty, population growth, infrastructure problems, environmental degradation, can escalate the aforementioned “human security” problem into a national security issue. Water security can be the catalyst for large-scale migration and ethnic conflicts, which ultimately, in more dire situations, can result in a decline in effective governance, potentially leading to a “failed state¹².” A June 2007 report by the United Nations Environment Programme (UNEP) suggested that the conflict in Darfur, Sudan, has in part been driven by climate change and environmental degradation, and more precisely by water scarcity/drought¹³.

- c) *International Security*: Water security issues can have a destabilising effect on regional and international security. Consequently when one or more countries share water resources, the potential for disputes and conflicts is always present. Ethnic unrest, mass migration, and declining economic conditions, fanned by freshwater scarcity, are not likely to be confined neatly within a country's borders¹⁴ (GBM Basin, Indus Basin). As one study has suggested, "a set of factors including demographics, rising demand resulting from improved living standards, the predominance of upstream over downstream—the first-served control the flow of rivers—may stoke smouldering conflicts¹⁵."

Water Scarcity and Violent Hydro-Conflict

"Fierce competition for fresh water may well become a source of conflict and wars in the future." (Kofi Annan, March 2001)¹⁶. Water poses both a threat and an opportunity. Increasing scarcity of clean fresh water impedes development, undercuts human health, and plays critical roles along the conflict continuum between and within states¹⁷. Today, population growth, surging demands for food and biofuels, global increases in living standards, and changing weather patterns mean there is even less water to go around. Meanwhile, scant supply and inadequate regional and global management have fueled tensions both within and between nations. The United Nations estimates 300 potential conflicts over water exist around the world today¹⁸. Water-related violence often occurs on the local rather than international level, and the intensity of conflict is generally inversely related to geographic scale¹⁹. And while conflicts often remain local, they can also impact stability at the national and regional levels. Even if international disputes over water-related issues do not typically cause violent conflict, they have led to interstate tensions and significantly hampered development, such as along the Nile, Mekong, Euphrates, Amu Darya, Syr Darya, and Ganges rivers²⁰. The likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change.

Intra-state/Domestic conflicts

Within states, water scarcity can assume an increasingly contentious and violent role when, for example, water-dependent sectors such as irrigated agriculture can no longer sustain farming livelihoods, leading to destabilising migration flows²¹. At the local level, competition over water use, its availability and allocation can lead to low-scale violence, which can escalate into instability within states and across sub-regions. Tensions between citizens and authorities over water issues may initially manifest themselves in the form of civil disobedience. They may, however, also escalate into acts of sabotage and violent protest if adequate political participation is not possible²². As pressure on fresh water supplies rises due to population growth, economic development and pollution, access to water, and its allocation and use, are becoming increasingly critical concerns that may have profound consequences on societal stability. However, intra-state conflicts may of the following kinds:

- **Conflict over access to adequate water supplies**

Conflict is most likely to occur over water when disputes involve access to water of adequate quantity and quality. Even when water supplies are not severely limited, allocation of water among different users and uses (agriculture and urban residents, for example) can be highly contested²³. Degraded water quality, which can pose serious threats to health, is also a source of potentially violent disputes. Finally, when water supplies for broadly irrigated regions decline either in terms of quantity or quality, those declines can spur migrations that could politically destabilise the receiving cities and/or neighbouring countries²⁴.

- **Water, livelihood loss, and civil conflict²⁵**

Water's importance in sustaining human livelihoods can indirectly link it to conflict. Water is a basic resource for agriculture, which is traditionally the largest source of livelihoods. If this livelihood is no longer available, people are often forced to search for job opportunities in the cities or turn to other, often illicit, ways to make a living. Migration—induced by lack of water, sudden droughts and floods, infrastructure construction (dams), pollution disasters, or livelihood loss—can produce tensions

between local and incoming communities, especially when it increases pressure on already scarce resources²⁶. And poverty due to livelihood loss has been identified as a common denominator of the causes of conflict in most of the civil wars that emerged in Africa, South Asia, and Latin America during the last decade²⁷.

- **Water management and conflict²⁸**

However, it is not the lack of water that leads to conflict, but the inadequate way the resource is governed and managed²⁹. There are many reasons why water management fails, including lack of adequate water institutions, inadequate administrative capacity, lack of transparency, ambiguous jurisdictions, overlapping functions, fragmented institutional structures, and lack of necessary infrastructure³⁰. Disaggregated decision-making often produces divergent management approaches that serve contradictory objectives and lead to competing claims from different sectors. And such claims are even more likely to contribute to disputes in countries where there is no formal system of water-use permits, or where enforcement and monitoring are inadequate. Controversy also often arises when management decisions are formulated without sufficient participation by local communities and water users, thus failing to take into account local rights and practices³¹. Direct violent conflicts over water are most likely on a local level, for example, over the privatisation of drinking water or access to a water point.

Table A: Management Capacity of the Selected River Basins in South Asia³²

Basin	Indicators				Parameters		
	GDP (PPP)	Water use	Population	AISF	MC _w	MC _s	MC _c
	US\$. capita ⁻¹	billion m ³	million people	per cent of population	-	-	-
GBM	1,807	304	582.9	40.0	0.91	0.60	0.50
Indus	4,002	257	215.8	51.8	0.86	0.48	0.375
Helmand	1,272	9.04	7.1	39	0.96	0.61	0.675

AISF: Access to Improved Sanitation Facility; MC_w = Water use inefficiency parameter; MC_s = Improved sanitation inaccessibility parameter; MC_c = Conflict management capacity parameter

It is observed from the table above that in addition to the availability (and uncertainty) of water resources, management efficiency (or inefficiency) also contributes to the vulnerability of the sub region's freshwater resources. The current management capacity to cope with (mis)match between water demand and supply is evaluated through: (1) efficiency of water use (measured as the GDP produced per unit of water use); and (2) human health conditions (measured by level of access to sanitation facility). Although the per capita GDP in the Indus Basin is more than double that of the GBM and Helmand basins (Table A), water use efficiencies in all three basins are very low³³. About 50 per cent of the people of the Indus basin have access to improved sanitation facilities, while the corresponding figure in both the GBM and Helmand Basins is about 40 per cent. Considering trans-boundary institutional arrangements for coordinated water resources development and management, and policies/ agreements, communication mechanisms, and cooperation for water resources management, both the GBM and Indus River basins can be considered moderately vulnerable (MC)³⁴.

Inter-state/International Conflicts

The world is rife with conflicts over waters, especially over use and management of trans-boundary waters. Rivers with trans-boundary nature, Brahmaputra, Mekong, Barak etc are becoming subjects of controversy over the right to manage the waters. Given that water flow ignores political and community boundaries, decisions in one place affect water use elsewhere. In the case of shared river

basins, water use upstream can affect downstream quality and quantity, thus creating the potential for conflicts of interest. Stronger countries use “exploitation potential”, both technical capacity and infrastructure to exploit water resources. Complex physical, political, and human interactions can make the management of shared water systems especially difficult³⁵. The UN's third 'World Water Development Report', presented ahead of the fifth World Water Forum warns of increased regional rivalry over water-related issues which will threaten fragile states by mounting security challenges.

The Strategic Importance of Water in South Asia

Water is increasingly viewed as a strategic resource, one that has to be protected and valued³⁶. Water, like religion and ideology, has the power to move millions of people. Since the very birth of human civilisation, people have moved to settle close to it (Mikhail Gorbachev, 2000)³⁷. The great civilisations of the world have evolved around water and South Asia is no exception. In South Asia, water encompasses the cultural, social, economic and political fabric in the lives of some 1.5 billion people. Water resources is key to agriculture, hydropower, and to sustain the aquatic environment. The region is endowed with great rivers that are the lifelines of the regional economy. Water is giving life, not only to organisms, but also to economies. The region's economy and predominantly rural livelihoods heavily depend on the timely arrival and performance of the monsoons. The monsoon is the most significant climate event: it carries over 70 percent of the region's annual precipitation in only four months. Because water is of critical importance for human survival, the well-being of nations often depends on its access to water.

Table- B: State of Water Resources of South Asian Countries³⁸

Parameter	Afghanistan	Bangladesh	Bhutan	India	Iran	Maldives	Nepal	Pakistan	Sri Lanka	World
Population (million) 2004	28.6	139.2	2.1	1,087.1	68.8	0.3	25.20	154.8	20.6	6,602.224 ^d
Water resources: total renewable (actual) (billion m ³ .yr ⁻¹) 2007 ^a	65.0	1211	95.0	1897	138	0.03	210	223	50.0	--
Water resources: total renewable per capita (actual) (m ³ .cap ⁻¹ .yr ⁻¹) 2003-2007 ^a	2503	7934	39716	1729	1946	88.8	7996	1382	2582	--
Water resources: total internal renewable (billion m ³ .yr ⁻¹) 2007 ^a	55.0	105	95.0	1261	128	0.03	198	52.4	50.0	4365 ^e
Water resources: total internal renewable per capita (m ³ .cap ⁻¹ .yr ⁻¹) 2003-2007 ^a	2118	688	39716	1149	1818	88.8	7539	325	2582	6900 (2003) ^e
Total (billion m ³)	23.3	79.4	--	645.8	72.9	--	10.2	169.4	12.6	3,807
Annual freshwater withdrawal (1987-2002) ^b	98	96	--	87	91	--	97	96	95	70
% for agriculture	0	1	--	6	2	--	1	2	3	20
% for industry	2	3	--	8	7	--	3	2	2	10
% domestic	--	0.6	--	0.8	1.6	--	0.6	0.5	1.3	8.6
Water productivity: GDP/water use (\$.m ⁻³) (1987-2004) ^b	--	0.6	--	0.8	1.6	--	0.6	0.5	1.3	8.6

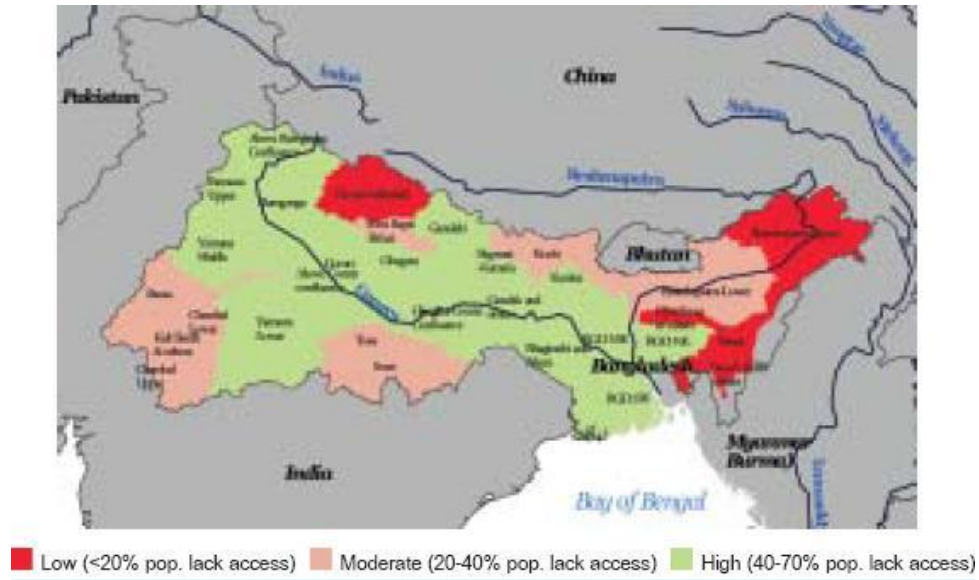
^a AQUASTAT database (FAO, 2007), ^b World development indicators (WB, 2006), ^c AQUASTAT database (FAO, 2006), ^d CIA (2007)

Climate Change and Water Security in South Asia

The impacts of climate change in the form of higher temperatures, more variable precipitation, and more extreme weather events threaten the water supply to millions of people living near South Asia's numerous river basins. The Ganges river basin alone is home to some 500 million people. The massive concentration of people around river basins, compounded by high and persistent poverty rates illustrates the vulnerability of the region to current hydrological shocks and longer-term climate change. The region remains highly vulnerable to droughts and floods that not only devastate lives and livelihoods, but also undermine progress on economic growth and poverty alleviation. Every year, some part of the region is usually in the grip of a devastating drought or in the fury of a flood. Climate change might exacerbate the damage caused by such events. It is predicted to amplify current levels of variability, and may fundamentally change most hydrological systems. With its heavy reliance on the monsoons and snow-fed rivers, water availability in the region is highly sensitive to climate change.

With the ever increasing demands of expanding human populations, horrifying effects of climate change and irresponsible use of water we head towards extremely testing times.

Figure-B: Development Pressures Emanating from Lack of access to Safe Drinking Water in the GBM Basin³⁹



The figure shows that the development and use of the water resources of this basin have been changing over decades, as more and more people are recognizing the economic, social and cultural importance of water. The pressures on water resources are mounting due to competing demands from different users in the basin. The irrigation sector comprises a major water user (about 88 per cent) in the GBM basin. The additional population growth in coming years will result in greater pressures on the available water resources, and specially irrigation in the Ganges sub-basins of India⁴⁰.

Trans-boundary Water Sharing and Disputes in South Asia

Trans-boundary watercourses traversing different states present a challenge in terms of management as they constitute different states with different interests as per their national needs and different groups of people in the different states with different needs⁴¹. Water connects the whole of South Asia historically and geographically and binds the countries of the region. Simultaneously, contentious issues of cross-border water distribution, utilisation, management and mega irrigation/hydro-electric power projects are gradually taking centre-stage in interstate relations as water scarcity increases and both drought and floods make life too often miserable. The issues of water distribution and management not only bring countries into conflict, but also provinces/states and regions within countries. Given the depleting resources of water, the issues of food, and water security as its most crucial part, are going to assume astronomical proportions.

Indo-Bangla Water Disputes

Bangladesh is the downstream and deltaic portion of a huge watershed, thereby being naturally vulnerable due to the quantity and poor quality of water that flows into it from the upstream. All major rivers flowing through Bangladesh originate outside its borders. India shares 54 trans-boundary

rivers with Bangladesh, including the major rivers of the Ganges, Brahmaputra and Meghna, making water management a major issue between the two nations. The many rivers crossing the India-Bangladesh border provide the basis for a series of ongoing disputes between the two countries, particularly India's efforts to divert water destined for Bangladesh. Disputes include disagreements over the Farraka Barrage, the Teesta River project and the River Linking Project.

Tipaimukh Dam: Concerns and Responses

The critiques of Tipaimukh dam to be built in Manipur is moving beyond imposed frontiers, the traditional expression of concerns once confined limitedly in Manipur and parts of Bangladesh now resonates from afar. The issue has now moved from the confines of Manipur Assembly discussion to the British and Bangladesh parliamentary debates to the deliberations of several United Nations human rights forums⁴². The Prime Ministers of India and Bangladesh discussed the contentious issue at the recently concluded Non Aligned Movement (NAM) summit, July 2009 in Egypt. Massive rallies, protest meetings, strikes and other forms of protest against the dam continues to gain momentum in Bangladesh. The peoples' concerns in Bangladesh are based on their bitter experience of severe water shortage and multifaceted impacts after commissioning of Farakka Barrage over the Ganges River by India.

Environmental Engineering and Concerns

Concerns raised include staggering environmental degradation, economic crisis and hydrological drought. The damming of Barak River, seriously limiting free flowing Surma and Kushyara rivers will disrupt agriculture, irrigation, drinking water supply, navigation etc and reduce recharge of ground water during lean season, affecting all dug wells and shallow tube wells. Bangladesh gets 7 to 8 percent of its total water from the Barak River. The Surma-Kushyara with its maze of numerous tributaries and distributaries support agriculture, irrigation and navigation, drinking water supply, fisheries, wildlife in the entire Sylhet division and in peripheral areas of Dhaka division and industries like fertilizer, electricity, gas. The dam would also leave millions jobless with the drying up of the two rivers. Millions of people are dependent on hundreds of water bodies, fed by the Barak, in the Sylhet



Proposed Tipaimukh Dam by India

Photo credit: <http://banglapraxis.wordpress.com>

region for fishing, agriculture and allied activities. The Barak-Surma-Kushyara is an international river with Bangladesh as a lower riparian country. The resolution of Tipaimukh dam seriously needs a multilateral, inclusive and human rights based approach to development and sensitivity to the concerns & established rights of all affected peoples.

Towards Effective Water Governance and Management in South Asia: Problems and Issues

“The water problems of our world need not be only a cause of tension; they can also be a catalyst for cooperation...If we work together, a secure and sustainable water future can be ours.” (Kofi Annan, February 2002)⁴³. The fact that water is scarce and non-substitutable makes it a potential cause for conflict. However, contrary to the long-held notion that the next world war will be fought over water resources, literature on the subject shows that there is more cooperation in the management of water resources than there is conflict⁴⁴. Water has also proven to be a productive pathway to confidence building, cooperation, and arguably conflict prevention. Cooperative incidents outnumbered conflicts by more than two to one from 1945-1999⁴⁵. Indeed, the potential for conflict over these water flows is great pointing to the need for cooperation between states as well as between basin users. The key variable is not absolute water scarcity, but the resilience of the institutions that manage water and its associated tensions. In some cases, water provides one of the few paths for dialogue in otherwise heated bilateral conflicts. In politically unsettled regions, water is often essential to regional development negotiations that serve as de facto conflict-prevention strategies⁴⁶. While rarely (if ever) starting a war between states, water allocation is often a key sticking point in ending conflict and undertaking national and regional reconstruction and development⁴⁷. Managing a common problem will require a cooperative solution that would include data collection and exchange, analysis, and exploration of shared responses. Water security is particularly challenging to achieve due to weak institutions, infrastructure and fragmented information. For effective governance the following issues may be considered:

- Regional water knowledge hubs and knowledge networking (Centres of Excellence –to become capacity building actor)
- Investment and modernisation of all types of irrigation systems
- Improved agricultural water governance
- Leveraging investments through partnerships for water security
- Pursuit of cooperative and basin-level development and management
- Development of communities of practice for policymakers, implementing agencies, water resources and irrigation system managers, water user and farmer organisations
- Development and adoption of regional guidelines for monitoring investment and results
- Mobilisation of the professional community in the region for analysis, advocacy, dissemination and
- Water financing and capacity development

Conclusion

Water is a fugitive resource, one which crosses political boundaries without a passport in the form of rivers, lakes and aquifers. Trans-boundary waters extend hydrological interdependence across national frontiers, linking users in different countries within a shared system⁴⁸. There are no viable generic solutions to the water vulnerability faced by the South Asian countries. Thus, for each selected river basin, the recommendations available for reducing the water resources vulnerability must rely on a unique mix of policy interventions and preferred routes for future water resources development⁴⁹. Water management is highly complex and extremely political. Balancing competing interests over water allocation and managing water scarcity require strong institutions. A reliable database, including meteorological, hydrological, and socioeconomic data, is a fundamental tool for deliberate and farsighted management of water resources⁵⁰. Trans-boundary cooperation around water, which stems from a drive for sustainable development in the face of shared stress, has a long and successful history. This development imperative—not the fear of conflict per se—motivates countries to pursue tough, protracted negotiations such as the Nile Basin Initiative (NBI)⁵¹.

Aggressively pursuing a water peacemaking strategy can provide dividends beyond water for stakeholders. It can build trust and serve as an avenue for dialogue when parties are stalemated on other issues. Trans-boundary water institutions have proven resilient, even as conflict is waged over other issues (e.g., Picnic Table Talks, Mekong Committee, Indus River Commission). The strategy

can also establish habits of cooperation among states, some with little experience (such as the states in the Kura-Araks basin in the Caucasus, or the Central Asian states of the former Soviet Union)⁵². It is an irony that Hydro-diplomacy in the Ganges-Brahmaputra-Meghna basin is still based on reductionist engineering, and looks at marginal economic benefits, without showing any concern for the long-run implications for livelihoods and ecosystem⁵³. As many of the rivers in the region are shared trans-boundary systems, regional coordination and cooperation will inevitably be required for both an increased understanding of the nature of climate challenges and the formulation of approaches to address such changes effectively. An understanding of water issues and of the support needed for investments, institutions, incentives, information and capacity inside the 'water sector' requires partnerships between those responsible for the economy-wide benefits of water and those responsible for managing water⁵⁴.

¹ Paul J. Smith & Lt. Col. Charles H. Gross, "Water and Conflict in Asia?" A Seminar Report, Asia-Pacific Centre for Security Studies (APCSS), Honolulu, Hawaii, September 17, 1999, p-1, available at http://www.apcss.org/Publications/Report_Water&Conflict_99.html

² Ibid, p-2

³ Ibid

⁴ Consortium of Non-Traditional Security Studies in Asia, *Water Security: Issues and Challenges in SEA*, A Fortnightly Bulletin of Current NTS Issues Confronting Asia, Centre for NTS Studies, S. Rajaratnam School of International Studies, NTU, Singapore, September 2008, p-2

⁵ World Water Assessment Programme, *The United Nations World Water Development Report 3: Water in a Changing World*, Paris: UNESCO, and London: Earthscan, 2009, p-29

⁶ Paul J. Smith & Lt. Col. Charles H. Gross, "Water and Conflict in Asia?" A Seminar Report, Asia-Pacific Center for Security Studies(APCSS), Honolulu, Hawaii, September 17, 1999, p-1 available at http://www.apcss.org/Publications/Report_Water&Conflict_99.html

⁷ Mukand S. Babel & Shahriar M. Wahid, *Freshwater Under Threat: South Asia*, jointly published by United Nations Environmental Programme (UNEP) and Asian Institute of Technology, Kenya: Nairobi, 2009, p-22, available at http://www.roap.unep.org/pub/southasia_report.pdf

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⁹ Ibid, p-2

¹⁰ Ibid

¹¹ Thomas F. Homer-Dixon, *Environment, Scarcity and Violence*, Princeton University Press, 1999, p-69

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¹³ Ibid

¹⁴ Ibid, p-3

¹⁵ France Bequette, "Water: Will there be Enough? Fresh or Drinking Water," *UNESCO Courier*, June, 1998, p-42

¹⁶ Quoted in Wolf Aaron T., et. al. "Water, Conflict and Cooperation", p-1, available at http://wilsoncenter.org/news/docs/Carius_Dabelko_Wolf.pdf

¹⁷ Ibid, p-1

¹⁸ "The Big Question: Will Global Conflict Flow from the Quest for Water Security?" Published in *World Policy Journal*, Vol. 26, No. 4, Winter 2009/10, World Policy Institute, 2009, p-5

¹⁹ Wolf. Aaron. T., *Water and Human Security (AVISO 3)*, Victoria, Canada: The Global Environmental Change and Human Security Project, June 1999,

²⁰ Wolf. Aaron. T., et. al. "Water, Conflict and Cooperation", p-1, available at http://wilsoncenter.org/news/docs/Carius_Dabelko_Wolf.pdf

²¹ Ibid

²² OECD-DAC (drafting of report led by the United States Agency for International Development), *Water and Violent Conflict*, Issue Brief, 2005, p-2

²³ Wolf Aaron T., et. al. "Water, Conflict and Cooperation," p-1, available at http://wilsoncenter.org/news/docs/Carius_Dabelko_Wolf.pdf

²⁴ Ibid

²⁵ Ibid

²⁶ Ibid

²⁷ Ohlsson. Leif, *Livelihood Conflicts: Linking Poverty and Environment as Causes of Conflict*, Stockholm: Swedish International Development Agency, Department of Natural Resources and the Environment, 2000

²⁸ Op cit, p- 2

²⁹ Ibid

³⁰ Ibid

³¹ Ibid

³² Mukand S. Babel & Shahriar M. Wahid, *Freshwater Under Threat: South Asia*, jointly published by United Nations Environmental Programme (UNEP) and Asian Institute of Technology, Kenya: Nairobi, 2009, p- 19, available at http://www.roap.unep.org/pub/southasia_report.pdf

³³ Ibid

³⁴ Ibid

³⁵ OECD-DAC (drafting of report led by the United States Agency for International Development), *Water and Violent Conflict*, Issue Brief, 2005, p-2

³⁶ Paul J. Smith & Lt. Col. Charles H. Gross, “Water and Conflict in Asia?” A Seminar Report, Asia-Pacific Centre for Security Studies (APCSS), Honolulu, Hawaii, September 17, 1999, p-4 available at http://www.apcss.org/Publications/Report_Water&Conflict_99.html

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⁴⁰ Ibid

⁴¹ Patricia Kameri-Mbote, “From Conflict to Cooperation in the Management of Trans-boundary Waters: The Nile Experience”, published in *Linking Environment and Security – Conflict Prevention and Peacemaking in East and Horn of Africa*, Washington, DC: Heinrich Boell Foundation, 2005, available at <http://www.ielrc.org/content/a0509.pdf>

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⁴⁶ Wolf Aaron .T, et. al. “Water, Conflict and Cooperation”, p-1, available at http://wilsoncenter.org/news/docs/Carius_Dabelko_Wolf.pdf

⁴⁷ Ibid

⁴⁸ Beatrice Mosello, “Water in Central Asia: A Prospect of Conflict or Cooperation?” available at <http://www.princeton.edu/~jpia/pdf08/Mosello%20Chapter%209.pdf>

⁴⁹ Mukand S. Babel & Shahriar M. Wahid, *Freshwater Under Threat: South Asia*, jointly published by United Nations Environmental Programme (UNEP) and Asian Institute of Technology, Kenya: Nairobi, 2009, p- xiii, available at http://www.roap.unep.org/pub/southasia_report.pdf

⁵⁰ Wolf Aaron T., et. al. "Water, Conflict and Cooperation", p-2, available at http://wilsoncenter.org/news/docs/Carius_Dabelko_Wolf.pdf

⁵¹ Ibid, p-3

⁵² Ibid

⁵³ Jayanta Bandyopadhyay & Nilanjan Ghosh, "Holistic Engineering and Hydro-Diplomacy in the Ganges-Brahmaputra-Meghna Basin", a special article published at *Economic and Political Weekly*, Vol: 44, Issue: 45, November 2009, p-50

⁵⁴ World Water Assessment Programme, *The United Nations World Water Development Report 3: Water in a Changing World*, Paris: UNESCO, and London: Earthscan, 2009,p-4.